Appendix B

1999 Environmental Monitoring Program

The WVDP Supports a Bluebird and Wood Duck Nesting-box Program Sponsored by the Springville Field and Stream Club

1999 Environmental Monitoring Program

The following schedule represents the West Valley Demonstration Project (WVDP) routine environmental monitoring program for 1999. This schedule met or exceeded the minimum program specifications needed to satisfy the requirements of DOE Order 5400.1. It also met the requirements of DOE 5400.5 and DOE/EH-0173T. Specific methods and recommended monitoring program elements are found in DOE/EP-0096, *A Guide for Effluent Radiological Measurements at DOE Installations*, and DOE/EP-0023, *A Guide for Environmental Radiological Surveillance at U.S. Department of Energy Installations,* which were the bases for selecting most of the schedule specifics. Additional monitoring was mandated by air and water discharge permits (40 CFR 61 and SPDES), which also required formal reports. Specifics are identified in the schedule under Monitoring/Reporting Requirements.

A computerized environmental data-screening system identifies analytical data that exceed pre-set limits. All locations are checked monthly for trends or notable results in accordance with criteria established in Documentation and Reporting of Environmental Monitoring Data (West Valley Nuclear Services Co., Inc. August 19, 1998). Reportable results are then described in the Monthly Trend Analysis Report (MTAR) together with possible causes and corrective actions, if indicated. A WVDP Effluent Summary Report (ESR) is transmitted with each MTAR.

Schedule of Environmental Sampling

The index on pp. B-v through B-vii is a list of the codes used to identify the various sampling locations, which are shown on Figures A-1 through A-12 (pp.A-3 through A-14 in Appendix A). The schedule of environmental sampling at the WVDP is found in this appendix on pages B-1 through B-44. Table headings in the schedule are as follows:

- ***Sample Location Code.*** Describes the physical location where the sample is collected. The code consists of seven or eight characters: The first character identifies the sample medium as **A**ir, **W**ater, **S**oil/**S**ediment, **B**iological, or **D**irect Measurement. The second character specifies o**N**-site or o**F**f-site. The remaining characters describe the specific location (e.g., **AFGRVAL** is **A**ir o**F**f-site at **GR**eat **VAL**ley). Distances noted at sampling locations are as measured in a straight line from the main stack on-site.

- ***Monitoring/Reporting Requirements***. Notes the bases for monitoring the location, any additional references to permits, and the reports that are generated from the sample data. Routine reports cited in this appendix are the Effluent Summary Report (ESR), the Monthly Trend Analysis Report (MTAR), the Air Emissions Report (NESHAP), and the annual Site Environmental Report (SER).

- ***Sampling Type/Medium.*** Describes the collection method and the physical characteristics of the medium.

- ***Collection Frequency.*** Indicates how often the samples are collected or retrieved.

- ***Total Annual Sample Collections.*** Specifies the number of discrete physical samples collected annually for each group of analytes.

- ***Analyses Performed/Composite Frequency.*** Notes the type of analyses of the samples taken at each collection, the frequency of composite, and the analytes determined for the composite samples.

Summary of Monitoring Program Changes in 1999

Location Code	Description of Changes
ANSTSTK	Stack monitoring equipment for the supernatant treatment system (STS)/permanent ventilation system (PVS) was upgraded in September 1999. Although the point of sample withdrawal remained the same in the PVS stack, associated equipment for real-time monitoring of stack effluents was relocated from the PVS building to a dedicated shelter nearby.
ANLAGAM	To accommodate replacement of the lag storage area (LSA)-4 waste storage structure, the on-site ambient air monitoring location for diffuse source emissions from the lag storage areas was co-located with stack monitoring equipment for the container sorting and packaging facility (ANCSPFK).

Index of Environmental Monitoring Program Sample Points

Air Effluent and On-site Ambient Air (Fig. A-4 [p. A-6])

Liquid Effluent and On-site Water (Figs.A-2 [p. A-4], A-3 [p.A-5], and A-12 [p. A-14])

* *Not detailed on map*

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(continued)

On-site Groundwater and Seeps (Figs.A-7 and A-8 [pp.A-9 and A-10)

Off-site Surface Water (Fig.A-3 [p.A-5])

Off-site Drinking Water (Figs.A-9 and A-12 [pp.A-11 and A-14])

Off-site Ambient Air (Figs.A-5 and A-12 [pp. A-7 and A-14])

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(concluded)

Fallout, Sediment, and Soil (Figs. A-2 through A-5 [pp.A-4 through A-7] and A-12 [p.A-14]

Off-site Biological (Figs. A-9 and A-12 [pp. A-11 and A-14])

Direct Measurement Dosimetry (Figs. A-10 through A-12 [pp. A-12 through A-14])

1999 Monitoring Program
On-site Effluent Monitoring

Air Effluents

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
ANSTACK *Main Plant Ventilation Exhaust Stack* **ANSTSTK** *Supernatant Treatment System (STS) Ventilation Exhaust* **ANCSSTK** *01-14 Building Ventilation Exhaust* **ANCSRFK** *Contact Size-reduction Facility Exhaust* **ANCSPFK** *Container Sorting and Packaging Facility Exhaust* **ANVITSK** *Vitrification HVAC Exhaust*	Airborne radioactive effluent points, including the LWTS and vitrification off-gas Required by: • 40 CFR 61 Reported in: • ESR • MTAR • SER • Air Emissions Annual Report (NESHAP)	Continuous off-line air particulate monitors	Continuous measurement of fixed filter; replaced weekly	NA	Real-time alpha and beta monitoring
		Continuous off-line air particulate filters	Weekly	52 each location	Gross alpha/beta, gamma isotopic*
				Weekly filters composited to 4 each location	Quarterly composites for Sr-90, U-232, U-233/234, U-235/236, U-238, total U, Pu-238, Pu-239/240, Am-241, gamma isotopic
		Continuous off-line desiccant columns for water vapor collection	Weekly	52 at each of two locations	H-3 (**ANSTACK** and **ANSTSTK** only)
		Continuous off-line charcoal cartridges	Weekly	Weekly cartridges composited to 4 each location	Quarterly composite for I-129
ANSEISK *Seismic Sampler, Vitrification Backup*	Airborne radioactive effluent point Required by: • 40 CFR 61 Reported in: • ESR • MTAR • SER	Continuous off-line air particulate filter	Weekly	52	Filters for gross alpha/ beta, gamma isotopic* upon collection

* Weekly gamma isotopic only if gross activity rises significantly.
NA Not applicable.

Sampling Rationale

ANSTACK DOE/EH-0173T, 3.0; DOE/EP-0096, 3.3

Monitors and samples HEPA-filtered ventilation from most process areas, including cell ventilation, vessel off-gas, fuel receiving and storage (FRS), head end ventilation, and an analytical aisle. Requires continuous effluent monitoring per 40 CFR Subpart H, Section 61.93(b) because potential emissions may exceed the 0.1 mrem limit.

ANSTSTK DOE/EH-0173T, 3.0; DOE/EP-0096, 3.3

Monitors and samples HEPA-filtered ventilation from building areas involved in treatment of high-level waste supernatant. Requires continuous effluent monitoring per 40 CFR Subpart H, Section 61.93(b) because potential emissions may exceed the 0.1 mrem limit.

ANCSSTK DOE/EH-0173T, 3.0; DOE-EP-0096, 3.3

Monitors and samples HEPA-filtered ventilation from the 01-14 building, which houses equipment used to treat the ceramic melter off-gas. Requires continuous effluent monitoring per 40 CFR Subpart H, Section 61.93(b) because potential emissions may exceed the 0.1 mrem limit.

ANCSRFK DOE/EH-0173T, 3.0; DOE-EP-0096, 3.3

Monitors and samples HEPA-filtered ventilation from a process area where radioactive tanks, pipes, and other equipment are cut up with a plasma torch to reduce volume.

ANCSPFK DOE/EH-0173T, 3.0; DOE-EP-0096, 3.3

Monitors and samples ventilation from lag storage area 4, the container sorting and packaging facility.

ANVITSK DOE/EH-0173T, 3.0; DOE-EP-0096, 3.3

Vitrification facility heating, ventilation, and air conditioning (HVAC) effluent exhaust stack. Sampler brought on-line in late 1995 when nonradioactive operations began. Radioactive operation began with the first high-level waste transfer in June 1996 and vitrification startup in July 1996.

ANSEISK DOE/EH-0173T, 3.0; DOE-EP-0096, 3.3

Vitrification system back-up filter for catastrophic-event monitoring in case the primary vitrification HVAC stack ventilation fails.

■ Sampling locations are shown on Figure A-4 (p.A-6).

1999 Monitoring Program
On-site Effluent Monitoring

Air Effluents

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
OVEs/PVUs *Outdoor Ventilated Enclosures/Portable Ventilation Units*	Airborne radioactive effluent points Required by: • 40 CFR 61 Reported in: • ESR • MTAR • SER • Air Emissions Annual Report (NESHAP)	Continuous off-line air particulate filter	→ As required	→ 1 each location	→ Filters for gross alpha/ beta, gamma isotopic* upon collection
				Collected filters** composited to 4	→ Quarterly composites for Sr-90, U-232, U-233/234, U-235/236, U-238, total U, Pu-238, Pu-239/240, Am-241, gamma isotopic

* Gamma isotopic only if gross activity rises significantly.

** If gross determination of individual filter is significantly higher than background, the individual sample would be submitted immediately for isotopic analysis.

Sampling Rationale

OVEs/PVUs DOE/EH-0173T, 3.0; DOE/EP-0096, 3.3

Outdoor ventilated enclosures; portable ventilation units used for handling radioactive materials or for decontamination in areas not having containment ventilation.

- Sampling locations are not shown on figures.

1999 Monitoring Program
On-site Effluent Monitoring

Air Effluents and On-site Ambient Air

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
ANLLW2V *Low-level Waste Treatment and Ventilation (new facility)* **ANLLWTVH** *Low-level Waste Treatment and Ventilation, "hot" side (former facility)* **ANLAUNV** *Laundry Change Room Ventilation*	Airborne radioactive effluent point Required by: • 40 CFR 61 Reported in: • ESR • MTAR • SER • Air Emissions Annual Report (NESHAP)	Continuous off-line air particulate filter	→ Quarterly	→ 4	Gross alpha/beta, gamma isotopic* upon collection
		Continuous off-line air particulate filter	→ Weekly	→ 52	
		Continuous off-line air particulate filter	→ Monthly	→ 12	
ANLAGAM *Lag Storage Area Ambient Air* **ANNDAAM** *NDA Ambient Air*	Ambient "diffuse source" air emissions Reported in: • MTAR • SER • Air Emissions Annual Report (NESHAP)	Continuous air particulate filter	→ Weekly	→ 52 each location	→ Gross alpha/beta
				Weekly filter composited to 4 each location	→ Quarterly composites for Sr-90, U-232, U-233/234, U-235/236, U-238, total U, Pu-238, Pu-239/240, Am-241, gamma isotopic
ANSDAT9** *SDA Trench 9 Ambient Air*	Ambient "diffuse source" air emissions Reported in: • MTAR • SER • Reported to NYSERDA	Continuous air particulate filter	→ Weekly	→ 52	→ Gross alpha/beta
				Weekly filter composited to 4	→ Quarterly composite for gamma isotopic
		Continuous off-line desiccant columns for water vapor	→ Weekly	→ 52	→ H-3
		Continuous off-line charcoal cartridges	→ Monthly	→ Monthly cartridges composited to 4	→ Quarterly composite for I-129

* Gamma isotopic only if gross activity rises significantly.
** Sampling frequency and analytical parameters as directed by NYSERDA.

Sampling Rationale

ANLLW2V DOE/EH-0173T, 3.0; DOE/EP-0096, 3.3

Samples ventilation exhaust from the new low-level waste treatment facility. System started up in April 1998.

ANLLWTVH DOE/EH-0173T, 3.0; DOE/EP-0096, 3.3

Samples radioactive side of ventilation exhaust from the former low-level waste treatment facility.

ANLAUNV DOE/EH-0173T, 3.0; DOE/EP-0096, 3.3

Samples ventilation from the contaminated clothing laundry.

ANLAGAM DOE/EH-0173T, 3.3.2

Monitors ambient air in the lag storage area, a possible diffuse source of air emissions.

ANNDAAM DOE/EH-0173T, 3.3.2

Monitors ambient air in the NDA area, a possible diffuse source of air emissions.

ANSDAT9 DOE/EH-0173T, 3.3.2

Monitors ambient air by SDA trench 9, a possible diffuse source of air emissions. WVDP support of NYSERDA.

■ Sampling locations are shown on Figure A-4 (p. A-6).

1999 Monitoring Program
On-site Effluent Monitoring

Liquid Effluents

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
WNSP001 *Lagoon 3 Discharge Weir*	Primary point of liquid effluent batch release Required by: • SPDES permit Reported in: • Monthly SPDES DMR • ESR • MTAR • SER	Grab liquid	Daily, during lagoon 3 discharge*	28-80	Daily for gross beta, conductivity, flow
				5-14	Every 6 days a sample is analyzed for gross alpha/ beta, H-3, Sr-90, gamma isotopic
				Composite of daily samples for each discharge, 4-8	Weighted composite for gross alpha/beta, H-3, C-14, Tc-99, Sr-90, I-129, gamma isotopic, U-232, U-233/234,U-235/236, U-238, total U, Pu-238, Pu-239/240, and Am-241 for each month of discharge
		Composite liquid	Twice during discharge, near start and near end	8-16	Two 24-hour composites for BOD_5, suspended solids, SO_4, NO_3, NO_2, NH_3, total Al, Fe, and Mn, total recoverable Cd, Cr, Cu, Ni, Pb, and Zn, dissolved As and Cu, dissolved sulfide
		Grab liquid	Twice during discharge, near start and near end	8-16	Settleable solids, total dissolved solids, pH, cyanide amenable to chlorination, oil & grease, surfactant (as LAS), total recoverable Co, Cr^{+6}, Se, and V, dichlorodifluoromethane, trichlorofluoromethane, 3,3-dichlorobenzidine, tributyl phosphate, hexachlorobenzene, alpha-BHC, heptachlor, xylene, 2-butanone
		Composite liquid	Semiannual	2	A 24-hour composite for titanium
		Composite liquid	Annual	1	A 24-hour composite for Ba and Sb
		Grab liquid	Semiannual	2	Bis(2-ethylhexyl) phthalate, 4-dodecene
		Grab liquid	Annual	1	Chloroform

* Lagoon 3 is discharged four to eight times per year, as necessary, averaging seven to ten days per discharge.

Sampling Rationale

WNSP001

DOE 5400.5; DOE/EH-0173T, 2.3.3; SPDES permit no. NY0000973

By DOE Order all liquid effluent streams from DOE facilities shall be evaluated and their potential for release of radionuclides addressed.

These requirements for radiological parameters are met by daily grab sampling during periods of lagoon 3 discharge. Sampling for chemical constituents is performed near the beginning and end of each discharge period to meet the site SPDES permit. Both grab samples and 24-hour composite samples are collected.

■ Sampling location is shown on Figure A-2 (p. A-4).

1999 Monitoring Program
On-site Effluent Monitoring

Liquid Effluents

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
WNSP006 *Frank's Creek at the Security Fence*	Combined facility liquid discharge Required by: • SPDES Permit Reported in: • Monthly SPDES DMR • MTAR • SER	Timed continuous composite liquid	Weekly	52	Gross alpha/beta, H-3, pH, conductivity
				Weekly samples composited to 12	Monthly composite for gamma isotopic and Sr-90 (shared with NYSDOH)
				Weekly samples composited to 4	Quarterly composite for C-14, I-129, U-232,U-233/234,U-235/236,U-238, total U, Pu-238, Pu-239/240, Am-241, Tc-99
		Grab liquid	4 times during lagoon 3 discharge, 2 near start, 2 near end; 1 after discharge is complete	8-16	TDS
		Grab liquid	Semiannual	2	NPOC, TOX, Ca, Mg, Na, K, Ba, Mn, Fe, Cl, SO_4, NO_3+NO_2-N, F, HCO_3, CO_3
WNURRAW *Utility Room Raw Water*	Source water Required by: • SPDES Permit Reported in: • Monthly SPDES DMR	Grab liquid	Weekly	52	Total Fe
		Grab liquid	Once before discharge of lagoon 3 and twice during discharge, near start and near end	8-16	TDS
WNSP007 *Sanitary Waste Discharge*	Liquid effluent point for sanitary and utility plant combined discharge Required by: • SPDES Permit Reported in: • Monthly SPDES DMR • ESR • MTAR • SER	24-hour composite liquid	3 each month	36	Gross alpha/beta, H-3, pH, suspended solids, NH_3, NO_2-N, BOD_5, total Fe
				Monthly samples composited to 4	Quarterly composite for gamma isotopic
		Grab liquid	3 each month	36	Oil & grease
		Grab liquid	Weekly	52	pH, settleable solids, total residual chlorine
		Grab liquid	Annual	1	Chloroform

Sampling Rationale

WNSP006 DOE/EH-0173T, 5.10.1.1; SPDES permit no. NY0000973

By DOE Order all liquid effluent streams from DOE facilities shall be evaluated and their potential for release of radionuclides addressed.

In accordance with the WVDP SPDES permit no. NY0000973, outfall 116 (pseudo-monitoring point) uses flow data from WNSP006. Flow augmentation parameters (flow and total dissolved solids [TDS]) are monitored at location WNSP006; calculated TDS and flow data related to sample point WNSP006 are reported for pseudo-monitoring point 116 in the monthly SPDES Discharge Monitoring Report (DMR).

WNURRAW SPDES permit no. NY0000973

TDS is measured near the beginning and end of each lagoon 3 discharge. Results are used for outfall 116 calculations. (See **WNSP006**, above.)

WNSP007 DOE 5400.5; DOE/EH-0173T, 2.3.3

Sampling rationale is based on New York State SPDES permit no. NY0000973 and DOE 5400.5 criteria.

■ Sampling locations are shown on Figure A-2 (p. A-4).

1999 Monitoring Program
Environmental Surveillance

On-site Surface Water

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
WNSWAMP *Northeast Swamp Drainage*	Site surface drainage Reported in: • ESR • MTAR • SER	Timed continuous composite liquid	Weekly	52	Gross alpha/beta, H-3, pH, conductivity
				Weekly samples composited to 12	Monthly composite for gamma isotopic and Sr-90 (shared with NYSDOH)
				Weekly samples composited to 4	Quarterly composite for C-14, I-129, U-232, U-233/234,U-235/236, U-238, total U, Pu-238, Pu-239/240, Am-241
		Grab liquid	Semiannual	2	NPOC, TOX, Ca, Mg, Na, K, Ba, Mn, Fe, Cl, SO_4, NO_3+NO_2-N, F, HCO_3, CO_3
WNSW74A *North Swamp Drainage*	Site surface drainage Reported in: • ESR • MTAR • SER	Timed continuous composite liquid	Weekly	52	Gross alpha/beta, H-3, pH, conductivity
				Weekly samples composited to 12	Monthly composite for gamma isotopic and Sr-90
				Weekly samples composited to 4	Quarterly composite for C-14, I-129, U-232, U-233/234,U-235/236, U-238, total U, Pu-238, Pu-239/240, Am-241
		Grab liquid	Semiannual	2	NPOC, TOX, Ca, Mg, Na, K, Ba, Mn, Fe, Cl, SO_4, NO_3+NO_2-N, F, HCO_3, CO_3
WN8D1DR *High-level Waste Farm Underdrain*	Drains subsurface water from HLW storage tank area Reported in: • MTAR • SER	Grab liquid	Weekly	52	Gross alpha/beta, H-3, pH
				Weekly samples composited to 12	Monthly composite for gamma isotopic and Sr-90
WNSDADR *SDA Run-off*	Surface water run-off from south portion of SDA Required by: • Interim Measures Compliance Reported in: • MTAR • SER • Reported to NYSERDA	Grab liquid	Monthly	12 maximum	pH, total suspended solids, oil & grease, flow, gross alpha/beta, H-3, gamma isotopic

Sampling Rationale

WNSWAMP DOE/EH-0173T, 5.10.1.1

Northeast site surface water drainage; provides for sampling of uncontrolled surface waters from this discrete drainage path just before they leave the site's controlled boundary. Waters represent surface and subsurface drainages from the construction and demolition debris landfill (CDDL), old hardstand areas, and other possible north plateau sources of radiological or nonradiological contamination.

WNSW74A DOE/EH-0173T, 5.10.1.1

North site surface water drainage; provides for sampling of uncontrolled surface waters from this discrete drainage path just before they leave the site's controlled boundary. Waters represent surface and subsurface drainages from lag storage areas and other possible north plateau sources of radiological or nonradiological contamination.

WN8D1DR DOE/EH-0173T, 5.10.1.3

Monitors the potential influence on subsurface drainage surrounding the high-level waste tank farm.

WNSDADR NYSERDA interim measures compliance.

WVDP support of NYSERDA. Monitors surface water run-off from south portion of the SDA.

■ Sampling locations are shown on Figure A-2 (p. A-4).

1999 Monitoring Program
Environmental Surveillance

On-site Surface Water

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
WNSP008 *French Drain*	Drains subsurface water from LLWTF lagoon area Required by: • SPDES Permit Reported in: • Monthly SPDES DMR • ESR • MTAR • SER	Grab liquid	Monthly	12	Gross alpha/beta, H-3
		Grab liquid	3 each month	36	Conductivity, pH, BOD_5, total Fe, total recoverable Cd and Pb
		Grab liquid	Annual	1	As, Cr, total Ag and Zn
WNSP005 *Facility Yard Drainage*	Combined drainage from facility yard area Reported in: • MTAR • SER	Grab liquid	Monthly	12	Gross alpha/beta, H-3, pH
WNCOOLW *Cooling Tower Basin*	Cools plant utility steam system water Reported in: • MTAR • SER	Grab liquid	Monthly	12	Gross alpha/beta, H-3, pH
				Monthly samples composited to 4	Quarterly composite for gamma isotopic

Sampling Rationale

WNSP008 DOE/EH-0173T, 5.10.1.3; SPDES permit no. NY0000973.

French drain of subsurface water from lagoon (LLWTF) area. The SPDES permit also provides for sampling of uncontrolled subsurface water from this discrete drainage path before these waters flow into Erdman Brook. Waters represent subsurface drainages from downward infiltration around the LLWTF and lagoon systems. This point would also monitor any subsurface spillover from the overfilling of lagoons 2 and 3. Sampling is of significance for both radiological and nonradiological contamination.

WNSP005 Facility yard surface water drainage; generally in accordance with DOE/EH-0173T, 5.10.1.1. Previously in accordance with SPDES permit no. NY0000973.

Provides for the sampling of uncontrolled surface waters from this discrete drainage path after outfall 007 discharge into the drainage and before these waters flow into Erdman Brook. Waters represent surface and subsurface drainages primarily from the main plant yard area. Historically, this point was used to monitor sludge pond and utility room discharges to the drainage. These two sources have been rerouted. Migration of residual site contamination around the main plant dictates surveillance of this point, primarily for radiological parameters.

WNCOOLW Facility cooling tower circulation water; generally in accordance with DOE/EH-0173T, 5.10.1.1.

Operational sampling carried out to confirm that radiological contamination is not migrating into the primary coolant loop of the HLWTF and/or plant utility steam systems. Migration from either source might indicate radiological control failure.

■ Sampling locations are shown on Figure A-2 (p. A-4).

1999 Monitoring Program
Environmental Surveillance

On-site Surface Water

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
WNFRC67* *Frank's Creek East of the SDA*	Drains NYS Low-level Waste Disposal Area Reported in: • MTAR • SER • Reported to NYSERDA	Grab liquid	Monthly	12	Gross alpha/beta, H-3, pH
WNERB53* *Erdman Brook North of Disposal Areas*	Drains NYS and WVDP disposal areas Reported in: • MTAR • SER • Reported to NYSERDA	Grab liquid	Weekly	52	Gross alpha/beta, H-3, pH
WNNDADR *Drainage between NDA and SDA*	Drains WVDP disposal and storage area Reported in: • MTAR • SER • Reported to NYSERDA	Timed continuous composite liquid	Weekly	52	pH
				Weekly samples composited to 12	Monthly composite for gross alpha/beta, gamma isotopic, H-3
				Weekly samples composited to 4	Quarterly composite for Sr-90, I-129
		Grab liquid	Weekly	52	NPOC, TOX
WNDCELD *Drainage South of Drum Cell*	Drains WVDP storage area Reported in: • MTAR • SER • Reported to NYSERDA	Grab liquid	Monthly	12	pH, gross alpha/beta
				Monthly samples composited to 4	Quarterly composite for Sr-90, I-129, gamma isotopic, H-3
WNNDATR** *NDA Trench Interceptor Project*	On-site groundwater interception Reported in: • MTAR • SER	Grab liquid	Monthly	12	Gross alpha/beta, H-3, gamma isotopic, NPOC, TOX
				Monthly samples composited to 4	Quarterly composite for I-129

* Monthly sample shared with NYSDOH.
** Coordinated with Waste Management Operations.

Sampling Rationale

WNFRC67 DOE/EH-0173T, 5.10.1.1

Monitors the potential influence of both the SDA and drum cell drainage into Frank's Creek east of the SDA and upstream of its confluence with Erdman Brook.

WNERB53 DOE/EH-0173T, 5.10.1.1

Monitors the potential influence of the drainages from the SDA and the WVDP storage and disposal area into Erdman Brook upstream of its confluence with Frank's Creek.

WNNDADR DOE/EH-0173T, 5.10.1.1

Monitors the potential influence of the drainages from the SDA and the WVDP storage and disposal area into Lagoon Road Creek upstream of the creek's confluence with Erdman Brook.

WNDCELD DOE/EH-0173T, 5.10.1.1

Monitors the potential influence of drum cell drainage into Frank's Creek south of the SDA and upstream of WNFRC67.

WNNDATR DOE 5400.1, IV.9

Monitors groundwater in the vicinity of the NDA interceptor trench project. The grab sample is taken directly from the trench collection system.

■ Sampling locations are shown on Figure A-2 (p. A-4).

1999 Monitoring Program
Environmental Surveillance

On-site Surface Water

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
WNSTAW Series *On-site standing water ponds not receiving effluent* **WNSTAW4** *Border Pond Southwest of AFRT240* **WNSTAW5** *Border Pond Southwest of DFTLD13* **WNSTAW6** *Borrow Pit Northeast of Project Facilities* **WNSTAW9** *North Reservoir near Intake* **WNSTAWB** *Background Pond at Sprague Brook Maintenance Building*	Water within vicinity of airborne or water effluent from the plant Reported in: • MTAR • SER	Grab liquid	Annual	1 each location*	Gross alpha/beta, H-3, pH, conductivity, Cl, Fe, Mn, Na, NO_3+NO_2-N, SO_4

* Sampling depends upon on-site ponding conditions during the year.

Sampling Rationale

WNSTAW Series DOE/EH-0173T, 5.10.1.1

Monitoring of on- and off-site standing waters at locations listed below. Although none receive effluent directly, the potential for contamination is present except at the background location. Former collecting sites 1,2,3,7, and 8 were deleted from the monitoring program because they were either built over or are now dry.

WNSTAW4 Border pond located south of AFRT240. Chosen as a location for showing potentially high concentrations, based on meteorological data. This perimeter location is next to a working farm. Drainage extends through private property and is accessible by the public.

WNSTAW5 Border pond located west of Project facilities near the perimeter fence and DFTLD13. Chosen as a location for showing potentially high concentrations, based on meteorological data. Location is next to a private residence and potentially accessible by the general public.

WNSTAW6 Borrow pit northeast of Project facilities just outside the inner security fence. Considered the closest standing water to the main plant and high-level waste facilities. (Used in lieu of WNSTAW1.)

WNSTAW9 North reservoir near intake. Chosen to provide data in the event of potentially contaminated site potable water supply. Location is south of main plant facilities.

WNSTAWB Pond located near the Sprague Brook maintenance building. Considered a background location; approximately 14 kilometers north of the WVDP.

■ Sampling locations are shown on Figures A-2, A-3, and A-12 (pp. A-4, A-5, and A-14).

1999 Monitoring Program
Environmental Surveillance

On-site Potable Water

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
WNDNK Series *Site Potable Water* **WNDNKMS** *Maintenance Shop Drinking Water* **WNDNKMP** *Main Plant Drinking Water* **WNDNKEL** *Environmental Laboratory Drinking Water* **WNDNKUR** *Utility Room (EP-1) Potable Water Storage Tank*	Sources of potable water within site perimeter Reported in: • MTAR • SER • Also reported to Cattaraugus County	Grab liquid	→ Monthly	→ 12 per location	→ Gross alpha/beta, H-3, pH, conductivity
		Grab liquid*	→ Annual	→ 1	→ As, Ba, Cd, Cr, Hg, Se, fluoride, NO_3 (as total nitrate)

* WNDNKUR only. Sample for NO_3 to be collected in March. Pb and Cu also are sampled at this site based upon Cattaraugus County Health Department guidance.

Sampling Rationale

WNDNK Series Site drinking water; generally according to DOE/EH-0173T, 5.10.1.2

Potable-water sampling to confirm no migration of radiological and/or nonradiological contamination into the site's drinking water supply.

WNDNKMS Potable water sampled at the maintenance shop in order to monitor a point that is at an intermediate distance from the point of potable water generation and that is used heavily by site personnel.

WNDNKMP Same rationale as WNDNKMS but sampled at the break room sink.

WNDNKEL Potable water sampled at the Environmental Laboratory.

WNDNKUR Sampled at the utility room potable water storage tank before the site drinking water distribution system. Sample location is entry point EP-1.

■ Sampling locations are within the site facilities and are not detailed on figures.

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On-site Groundwater

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
Low-level Waste Treatment Facilities *(SSWMU #1)* 103 104 U 105 106 107 108 110 111 116 U 8604 U 8605 **Miscellaneous Small Units** *(SSWMU #2)* 201 U 204 U 205 206 208 **Liquid Waste Treatment System** *(SSWMU #3)* 301 B 302 U	Groundwater monitoring points around site super solid waste management units (SSWMUs) Reported in: • SER • Quarterly Groundwater Reports	Grab liquid	4 times per year (generally)*	4 each well (generally)*	Gross alpha, gross beta, H-3 *
		Direct field measurement of sample discharge water	Each sampling event*	Twice each sampling event	Conductivity, pH

NOTE: "U" designates upgradient, "B" designates background, and "C" designates crossgradient wells. The remainder are downgradient.

* Sampling frequency and analytes vary from point to point. See Table 3-1 (p.3-6) for a summary sampling schedule and a listing of analytes. See Table E-1 (Appendix E, p. E-3) for a listing of analytes monitored at each location. See Appendix E for results from each location.

Sampling Rationale

On-site Groundwater

DOE Order 5400.1, IV.9; DOE/EH-0173T, 5.10.1.3; 40 CFR Parts 264 and 265, Subpart F

The on-site WVDP groundwater monitoring program provides for the determination of water quality, focusing on radiological and chemical surveillance of both active and inactive super solid waste management units (SSWMUs). In addition, using wells situated hydraulically upgradient (background) and downgradient of SSWMUs allows both detection of groundwater contamination and evaluation of the effects associated with the individual SSWMUs. Groundwater protection is addressed in the Groundwater Protection Plan, WVDP-091. Groundwater monitoring is detailed in the Groundwater Monitoring Plan, WVDP-239.

SSWMU #1 Low-level waste treatment facilities, including four active lagoons — lagoons 2, 3, 4, and 5 — and an inactive, filled-in lagoon — lagoon 1.

SSWMU #2 Miscellaneous small units, including the sludge pond, the solvent dike, the paper incinerator, the equalization basin, and the kerosene tank.

SSWMU #3 Liquid waste treatment system containing effluent from the supernatant treatment system.

■ Sampling locations are shown on Figure A-7 (p.A-9).

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On-site Groundwater

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
HLW Storage and Processing Tank *(SSWMU #4)* 401 B 402 U 403 U 405 C 406 408 409 **Maintenance Shop Leach Field** *(SSWMU #5)* 501 U 502 **Low-level Waste Storage Area** *(SSWMU #6)* 602A 602 604 605 8607 U 8609 U **Chemical Process Cell Waste Storage Area** *(SSWMU #7)* 704 706 B 707	Groundwater monitoring points around site super solid waste management units (SSWMUs) Reported in: • SER • Quarterly Groundwater Reports	Grab liquid	4 times per year (generally)*	4 each well (generally)*	Gross alpha, gross beta, H-3 *
		Direct field measurement of sample discharge water	Each sampling event*	Twice each sampling event	Conductivity, pH

NOTE: "U" designates upgradient, "B" designates background, and "C" designates crossgradient wells. The remainder are downgradient.

* Sampling frequency and analytes vary from point to point. See Table 3-1 (p. 3-6) for a summary sampling schedule and a listing of analytes. See Table E-1 (Appendix E, p. E-3) for a listing of analytes monitored at each location. See Appendix E for results from each location.

Sampling Rationale

On-site Groundwater

DOE Order 5400.1, IV.9; DOE/EH-0173T, 5.10.1.3; 40 CFR Parts 264 and 265, Subpart F

The on-site WVDP groundwater monitoring program provides for the determination of water quality, focusing on radiological and chemical surveillance of both active and inactive super solid waste management units (SSWMUs). In addition, using wells situated hydraulically upgradient (background) and downgradient of SSWMUs allows both detection of groundwater contamination and evaluation of the effects associated with the individual SSWMUs. Groundwater protection is addressed in the Groundwater Protection Plan, WVDP-091. Groundwater monitoring is detailed in the Groundwater Monitoring Plan, WVDP-239.

SSWMU #4 High-level waste storage and processing area, including the high-level radioactive waste tanks, the supernatant treatment system, and the vitrification facility.

SSWMU #5 Maintenance shop sanitary leach field, formerly used by NFS and the WVDP to process domestic sewage generated by the maintenance shop.

SSWMU #6 Low-level waste storage area; includes metal and fabric structures housing low-level radioactive waste being stored for future disposal.

SSWMU #7 Chemical process cell (CPC) waste storage area, which contains packages of pipes, vessels, and debris from decontamination and cleanup of the chemical process cell in the former reprocessing plant.

■ Sampling locations are shown on Figure A-7 (p.A-9).

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On-site Groundwater

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
Construction and Demolition Debris Landfill (CDDL) *(SSWMU #8)* 801 U 802 803 804 8603 U 8612 **NRC-licensed Disposal Area (NDA)** *(SSWMU #9)* 901 U 902 U 903 906 908 U 909 910 8610 8611 NDATR **IRTS Drum Cell** *(SSWMU #10)* 1005 U 1006 1007 1008b B 1008c B	Groundwater monitoring points around site super solid waste management units (SSWMUs) Reported in: • SER • Quarterly Groundwater Reports	Grab liquid	4 times per year (generally)*	4 each well (generally)*	Gross alpha, gross beta, H-3 *
		Direct field measurement of sample discharge water	Each sampling event*	Twice each sampling event	Conductivity, pH

NOTE: "U" designates upgradient, "B" designates background, and "C" designates crossgradient wells. The remainder are downgradient.

* Sampling frequency and analytes vary from point to point. See Table 3-1 (p.3-6) for a summary sampling schedule and a listing of analytes. See Table E-1 (Appendix E, p. E-3) for a listing of analytes monitored at each location. See Appendix E for results from each location.

Sampling Rationale

On-site Groundwater

DOE Order 5400.1, IV.9; DOE/EH-0173T, 5.10.1.3; 40 CFR Parts 264 and 265, Subpart F

The on-site WVDP groundwater monitoring program provides for the determination of water quality, focusing on radiological and chemical surveillance of both active and inactive super solid waste management units (SSWMUs). In addition, using wells situated hydraulically upgradient (background) and downgradient of SSWMUs allows both detection of groundwater contamination and evaluation of the effects associated with the individual SSWMUs. Groundwater protection is addressed in the Groundwater Protection Plan, WVDP-091. Groundwater monitoring is detailed in the Groundwater Monitoring Plan, WVDP-239.

SSWMU #8 The construction and demolition debris landfill (CDDL); used by NFS and the WVDP to dispose of nonhazardous and nonradioactive materials.

SSWMU #9 The NRC-licensed disposal area (NDA); contains radioactive wastes generated by NFS and the WVDP.

SSWMU #10 The integrated radioactive waste system (IRTS) treatment drum cell; stores cement-stablized low-level radioactive waste.

■ Sampling locations are shown on Figures A-6 and A-7 (pp.A-9 and A-10).

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On-site Groundwater and Seeps

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
State-licensed Disposal Area *(SSWMU #11)**	Groundwater monitoring points around site super solid waste management units (SSWMUs)	Grab liquid	Semiannual	2 each well	Gross alpha/beta, H-3, pH, conductivity, turbidity
1101a U 1101b U 1101c U 1102a 1102b 1103a 1103b 1103c 1104a 1104b 1104c 1105a 1105b 1106a U 1106b U 1107a 1108a U 1109a U 1109b U 1110a 1111a	Reported in: • SER	Grab liquid	Annual	1 each well	Gamma scan, beta-emitters (C-14, Sr-90, I-129, Tc-99), VOCs
North Plateau Seeps *(Not in a SSWMU)*	Groundwater seepage points along the northeastern edge of the north plateau	Grab liquid	Semiannual	2 each seep	Gross alpha/beta, H-3 (pH, conductivity, and VOCs at SP12)
GSEEP SP02 SP04 SP05 SP06 SP11 SP12 SP18 SP23	Reported in: • SER • Quarterly Groundwater Reports				
Miscellaneous *Well Points (Not in a SSWMU)* WP-A WP-C WP-H	Well points downgradient of main plant and the former sand and gravel unit background well	Grab liquid	Annual	1 each well	Gross alpha/beta, H-3, pH, conductivity
NB1S *(Former background well)*	Reported in: • SER • Quarterly Groundwater Reports	Field measurement	Quarterly	4	pH, conductivity
		Grab liquid	Quarterly	4	Gross alpha/beta, H-3

NOTE: "U" designates upgradient, "B" designates background, and "C" designates crossgradient wells. The remainder are downgradient.
* SSWMU #11 is sampled by NYSERDA under a separate program.

Sampling Rationale

On-site Groundwater

DOE Order 5400.1, IV.9; DOE/EH-0173T, 5.10.1.3; 40 CFR Parts 264 and 265, Subpart F

The on-site WVDP groundwater monitoring program provides for the determination of water quality, focusing on radiological and chemical surveillance of both active and inactive super solid waste management units (SSWMUs). In addition, using wells situated hydraulically upgradient (background) and downgradient of SSWMUs allows both detection of groundwater contamination and evaluation of the effects associated with the individual SSWMUs. Groundwater protection is addressed in the Groundwater Protection Plan, WVDP-091. Groundwater monitoring is detailed in the Groundwater Monitoring Plan, WVDP-239.

SSWMU #11 The New York State-licensed disposal area (SDA) was operated by NFS as a commercial low-level disposal facility; it also received wastes from NFS reprocessing operations.

North Plateau Seeps Monitor groundwater emanating from the ground surface along the edge of the site's north plateau.

Well Points Monitor groundwater of known subsurface contamination in the north plateau area. All well points are downgradient of the main plant.

WNWNB1S Former background well on the north plateau.

■ Sampling locations are shown on Figures A-7 and A-8 (pp.A-9 and A-10).

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Off-site Surface Water

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
WFBCTCB* *Buttermilk Creek Upstream of Confluence with Cattaraugus Creek at Thomas Corners Road*	Restricted surface waters receiving plant effluents Reported in: • MTAR • SER	Timed continuous composite liquid	Weekly	52	pH, conductivity
				Weekly samples composited to 12	Monthly composite for gross alpha/beta, H-3
				Weekly samples composited to 4	Quarterly composite for gamma isotopic and Sr-90
WFFELBR* *Cattaraugus Creek at Felton Bridge*	Unrestricted surface waters receiving plant effluents Reported in: • MTAR • SER	Timed continuous composite liquid	Weekly	52	Gross alpha/beta, H-3, pH
				Weekly samples composited to 12	Flow-weighted monthly composite for gamma isotopic and Sr-90, gross alpha/beta, H-3
WFBCBKG* *Buttermilk Creek near Fox Valley (background)*	Unrestricted surface water, background Reported in: • MTAR • SER • Reported to NYSERDA	Timed continuous composite liquid	Weekly	52	pH, conductivity
				Weekly samples composited to 12	Monthly composite for gross alpha/beta, H-3
				Weekly samples composited to 4	Quarterly composite for gamma isotopic, Sr-90, C-14, I-129, U-232, U-233/234,U-235/236, U-238, total U, Pu-238, Pu-239/240, Am-241, Tc-99
		Grab liquid	Semiannual	2	NPOC, TOX, Ca, Mg, Na, K, Ba, Mn, Fe, Cl, SO_4, NO_3+NO_2-N, F, HCO_3, CO_3
WFBIGBR *Cattaraugus Creek at Bigelow Bridge (background)*	Unrestricted surface water, background Reported in: • MTAR • SER	Grab liquid	Monthly	12	Gross alpha/beta, H-3, Sr-90, gamma isotopic

* Monthly composites are also sent to NYSDOH.

Sampling Rationale

WFBCTCB DOE/EH-0173T, 5.10.1.1

Buttermilk Creek is the surface water that receives all WVDP effluents. WFBCTCB monitors the potential influence of WVDP drainage into Buttermilk Creek upstream of Buttermilk Creek's confluence with Cattaraugus Creek.

WFFELBR DOE/EH-0173T, 5.10.1.1

Because Buttermilk Creek empties into Cattaraugus Creek, WFFELBR monitors the potential influence of WVDP drainage into Cattaraugus Creek directly downstream of the Cattaraugus Creek confluence with Buttermilk Creek.

WFBCBKG DOE/EH-0173T, 5.10.1.1

Monitors background conditions of Buttermilk Creek upstream of the WVDP; allows comparison to downstream conditions.

WFBIGBR DOE/EH-0173T, 5.10.1.1

Monitors background conditions of Cattaraugus Creek at Bigelow Bridge, upstream of the WVDP; allows comparison to downstream conditions.

■ Sampling locations are shown on Figure A-3 (p. A-5).

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Off-site Drinking Water

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
WFWEL Series *Wells outside the WNYNSC perimeter but near the WVDP* **WFWEL01** *3.0 km West-Northwest* **WFWEL02** *1.5 km Northwest* **WFWEL03** *3.5 km Northwest* **WFWEL04** *3.0 km Northwest* **WFWEL05** *2.5 km Southwest* **WFWEL06** *(background)* *29 km South* **WFWEL07** *4.4 km North-Northeast* **WFWEL08** *2.5 km East-Northeast* **WFWEL09** *3.0 km Southeast* **WFWEL10** *7.0 km North*	Drinking water supply; groundwater near facility* Reported in: • MTAR • SER	Grab liquid	→ Annual	→ 1 each location	→ Gross alpha/beta, H-3, gamma isotopic, pH, conductivity

* No drinking water wells are located in hydrogeological units affected by site activity.

Sampling Rationale

Off-site Drinking Water WFWEL Series

DOE 5400.1, IV.9; DOE/EH-0173T, 5.10.1.2

Eight of the ten listed off-site private residential drinking water wells represent the nearest unrestricted uses of groundwater close to the WVDP. The ninth sample (**WFWEL10**) is taken from a public water supply from deep wells. The tenth drinking water well, **WFWEL06**, is located 29 kilometers south of the Project and is considered a background drinking water source.

■ Sampling locations are shown on Figures A-9 and A-12 (pp. A-11 and A-14).

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Off-site Air

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
AFFXVRD *3.0 km South-Southeast at Fox Valley* **AFTCORD** *3.7 km North-Northwest at Thomas Corners Road* **AFRT240*** *2.0 km Northeast on Route 240* **AFSPRVL** *9.4 km North at Springville* **AFWEVAL** *6.2 km South-Southeast at West Valley* **AFNASHV** *39.8 km West at Village of Nashville, Town of Hanover (background)* **AFBOEHN** *2.3 km Southwest on Dutch Hill Road* **AFRSPRD** *1.5 km Northwest on Rock Springs Road* **AFGRVAL** *30.9 km South at Great Valley (background)* **AFBLKST** *Bulk Storage Warehouse 2.2 km East-Southeast at Buttermilk Road*	Particulate air samples around WNYNSC perimeter Reported in: • MTAR • SER	Continuous air particulate filter	→ Weekly	→ 52 each location	→ Gross alpha/beta
				Weekly filters composited to 4 each location	→ Quarterly composite for Sr-90 and gamma isotopic (plus U-232, U-233/234, U-235/236, U-238, total U, Pu-238, Pu-239/240, and Am-241 at **AFRSPRD** and **AFGRVAL)**
		Continuous desiccant column for water vapor collection at **AFRSPRD** and **AFGRVAL**	→ Weekly	→ 52 each location	→ H-3
		Continuous charcoal cartridge at **AFRSPRD** and **AFGRVAL**	→ Monthly	→ 12 composited to 4 each location	→ Quarterly composite for I-129

* Filter from duplicate sampler sent to NYSDOH.

Sampling Rationale

AFFXVRD
AFTCORD
AFRT240 DOE/EH-0173T, 5.7.4

Air samplers put into service by NFS as part of the site's original monitoring program at perimeter locations chosen to obtain data from places most likely to provide highest concentrations. Choice of location based on meteorological data.

AFSPRVL DOE/EH-0173T, 5.7.4; DOE/EP-0023, 4.2.3

Off-site (remote) sampler located on private property in nearby community within 15 kilometers of the site (north).

AFWEVAL DOE/EH-0173T, 5.7.4; DOE/EP-0023, 4.2.3

Off-site (remote) sampler located on private property in nearby community within 15 kilometers of the site (southeast).

AFNASHV DOE/EH-0173T, 5.7.4; DOE/EP-0023, 4.2.3

Off-site (remote) sampler considered representative of natural background radiation. Located 39.8 kilometers west of the site (upwind) on privately owned property.

AFBOEHN DOE/EH-0173T, 5.7.4; DOE/EP-0023, 4.2.3

Perimeter location chosen to obtain data from the place most likely to provide the highest elevated release concentrations. AFBOEHN is located on NYSERDA property at the perimeter. Choice of location based on meteorological data.

AFRSPRD DOE/EH-0173T, 5.7.4

Perimeter location chosen to obtain data from the place most likely to provide the highest ground-level release concentrations. AFRSPRD is on WNYNSC property outside the main plant operations fenceline. I-129 and H-3 are sampled here because the sampling trains were easy to incorporate and the location was most likely to receive effluent releases. Choice of location based on meteorological data.

AFGRVAL DOE/EH-0173T, 5.7.4; DOE/EP-0023, 4.2.3

Off-site (remote) sampler considered representative of natural background radiation. Located on privately owned property 30.9 kilometers south of the site (typically upwind). I-129 and H-3 sampled here also.

AFBLKST DOE/EH-0173T, 5.7.4

Off-site monitoring of bulk storage warehouse, near the site perimeter.

■ Sampling locations are shown on Figures A-5 and A-12 (pp. A-7 and A-14).

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Fallout, Sediment, and Soil

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
AFDHFOP *2.3 km Southwest* **AFFXFOP** *3.0 km South-Southeast* **AFTCFOP** *3.7 km North-Northwest* **AF24FOP** *2.0 km Northeast* **ANRGFOP** *Rain gauge on-site*	Collection of fallout particulates and precipitation around the WNYNSC perimeter Reported in: • MTAR • SER	Integrated precipitation	Monthly	12 each location	Gross alpha/beta, H-3, pH, gamma isotopic
SF Soil Series *Surface soil at each of 10 air samplers*	Long-term fallout accumulation Reported in: • MTAR • SER	Surface plug composite soil	Annual	1 each location	Gross alpha/beta, gamma isotopic, Sr-90, Pu-239/240, and Am-241 (plus U-232, U-233/234, U-235/236, U-238, and total U at **SFRSPRD**, **SFBOEHN**, and **SFGRVAL)**
SFCCSED *Cattaraugus Creek at Felton Bridge* **SFSDSED** *Cattaraugus Creek at Springville Dam* **SFBISED** *Cattaraugus Creek at Bigelow Bridge (background)* **SFTCSED** *Buttermilk Creek at Thomas Corners Road* **SFBCSED** *Buttermilk Creek at Fox Valley Road (background)*	Deposition in sediment downstream of facility effluents Reported in: • MTAR • SER	Grab stream sediment	Annual (Split **SFSDSED** and **SFBCSED** with NYSDOH)	1 each location	Gross alpha/beta, gamma isotopic, Sr-90, U-232, U-233/234, U-235/236, U-238, total U, Pu-238, Pu-239/240, and Am-241
SN On-site Soil Series: **SNSW74A** *(Near WNSW74A)* **SNSWAMP** *(Near WNSWAMP)* **SNSP006** *(Near WNSP006)*	Reported in: • MTAR • SER	Surface plug or grab	Annual	1 each location	Gross alpha/beta, gamma isotopic, Sr-90, U-232, U-233/234, U-235/236, U-238, total U, Pu-239/240, and Am-241, Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn

Sampling Rationale

AFDHFOP
AFFXFOP
AFTCFOP
AF24FOP

DOE/EP-0023, 4.7

Collection of fallout particles and precipitation around the site perimeter at established air sampling locations: **AFDHFOP** (Dutch Hill at Boehn Road), **AFFXFOP** (Fox Valley Road), **AFTCFOP** (Thomas Corners), **AF24FOP** (Route 240). Indicates short-term effects.

ANRGFOP

Fallout particles and precipitation collected on-site by the Environmental Laboratory at the rain gauge. Indicates short-term effects.

SF Soil Series

DOE/EH-0173T, 5.9.1

Off-site soils collected at air sampling locations. **SFWEVAL** (West Valley), **SFFXVRD** (Fox Valley Road), **SFSPRVL** (Springville), **SFTCORD** (Thomas Corners), **SFRT240** (Route 240), **SFNASHV** (Nashville), **SFBOEHN** (Boehn Road-Dutch Hill), **SFGRVAL** (Great Valley), **SFRSPRD** (Rock Springs Road), **SFBLKST** (bulk storage warehouse): Collection of long-term fallout data at established air sampler locations via soil sampling.

SFCCSED

DOE/EH-0173T, 5.12.1

Sediment deposition at Cattaraugus Creek at Felton Bridge. Location is first point of public access to Cattaraugus Creek downstream of its confluence with Buttermilk Creek.

SFSDSED

DOE/EH-0173T, 5.12.1

Sediment deposition in Cattaraugus Creek at Springville Dam. Reservoir provides ideal settling and collection location for sediments downstream of Buttermilk Creek confluence with Cattaraugus Creek. Located downstream of **SFCCSED**.

SFBISED

DOE/EH-0173T, 5.12.1

Sediment deposition in Cattaraugus Creek at Bigelow Bridge. Location is upstream of the Buttermilk Creek confluence and serves as the Cattaraugus Creek background location.

SFTCSED

DOE/EH-0173T, 5.12.1

Sediment deposition in Thomas Corners in Buttermilk Creek immediately downstream of all facility liquid effluents.

SFBCSED

DOE/EH-0173T, 5.12.1

Sediment deposition in Buttermilk Creek upsteam of facility effluents (background).

SN Soil Series

DOE/EH-0173T, 5.9.1.

On-site soil. (Samples may be partially composed of sediments.) **SNSW74A** (surface soil near **WNSW74A**), **SNSWAMP** (surface soil near **WNSWAMP**), and **SNSP006** (surface soil near **WNSP006**): Locations to be specifically defined by geographic coordinates. Correspond to site drainage pattern flows (i.e., most likely area of radiological deposition/accumulation).

■ Sampling locations are shown on Figures A-2 through A-5 and A-12 (pp.A-4 through A-7 and A-14).

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Off-site Biological

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
BFFCATC *Fish from Cattaraugus Creek downstream of its confluence with Buttermilk Creek* **BFFCATD** *Fish from Cattaraugus Creek downstream of the Springville Dam* **BFFCTRL** *Control fish sample from nearby stream not affected by the WVDP (7 km or more upstream of site effluent point; background)*	Fish in waters up- and downstream of facility effluents Reported in: • MTAR • SER	Individual collection, biological	Semiannual (samples at **BFFCATC** and **BFFCTRL** shared with NYSDOH)	20 fish each location	Gamma isotopic and Sr-90 in edible portions of each individual fish; % moisture
			Annual (**BFFCATD** only)	10 fish	Gamma isotopic and Sr-90 in edible portions of each individual fish; % moisture
BFMREED *Dairy farm 3.8 km North-Northwest* **BFMCOBO** *Dairy farm 1.9 km West-Northwest* **BFMCTLS** *Control location 25 km South (background)* **BFMCTLN** *Control location 30 km North (background)*	Milk from animals foraging at locations near the facility perimeter and at background sites Milk from animals foraging at background sites Reported in: • MTAR • SER	Grab biological	Monthly (samples at **BFMREED** and **BFMCOBO** shared with NYSDOH)	12 monthly samples composited to 4 each location	Quarterly composite for gamma isotopic, Sr-90, H-3, and I-129
BFMWIDR *Dairy farm 3.0 km Southeast* **BFMSCHT** *Dairy farm 4.8 km South*	Milk from animals foraging near the site perimeter Reported in: • MTAR • SER	Grab biological	Annual	1 each location	Gamma isotopic, Sr-90, H-3, and I-129

Sampling Rationale

BFFCATC **BFTCATD**	DOE/EH-0173T, 5.11.1.1 Radioactivity may enter a food chain in which fish are a major component and are consumed by the local population.
BFFCTRL	Control fish sample; provide background data for comparison with data from fish caught downstream of facility effluents.
BFMREED **BFMCOBO** **BFMCTLS** **BFMCTLN**	DOE/EH-0173T, 5.8.2.1 Milk is consumed by all age groups and is frequently the most important food that could contribute to the radiation dose. Dairy animals pastured near the site and at two background locations allow adequate monitoring. Control milk samples are collected far from the site to provide background data for comparison with data from near-site milk samples.
BFMWIDR **BFMSCHT**	Milk from animals foraging around facility perimeter.

■ Sampling locations are shown on Figures A-9 and A-12 (pp. A-11 and A-14).

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Off-site Biological

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
BFVNEAR *Nearby locations* **BFVCTRL** *Remote locations (16 km or more from facility; background)*	Fruit and vegetables grown near facility perimeter, downwind if possible, and at background locations Reported in: • MTAR • SER	Grab biological (fruits and vegetables)	→ Annual (at harvest)	→ 3 each (split with NYSDOH)	→ Gamma isotopic and Sr-90 analysis of edible portions, H-3 in free moisture; % moisture
BFHNEAR *Forage for beef cattle/ milk cows from near-site location* **BFHCTLS or BFHCTLN** *Forage for beef cattle/ milk cows from control location south or north (background)*	Forage (hay) grown near facility perimeter, downwind if possible, and at background locations Reported in: • MTAR • SER	Grab biological	→ Annual	→ 1 each location	→ Gamma isotopic, Sr-90
BFBNEAR *Beef animal from nearby farm in downwind direction* **BFBCTRL** *Beef animal from control location 16 km or more from facility (background)*	Meat (beef foraging near facility perimeter, downwind if possible, and a background location) Reported in: • MTAR • SER	Grab biological	→ Semiannual	→ 2 each location	→ Gamma isotopic and Sr-90 analysis of meat, H-3 in free moisture; % moisture
BFDNEAR *Deer in vicinity of the site* **BFDCTRL** *Control deer 16 km or more from the facility (background)*	Venison (deer foraging near facility perimeter and at background locations) Reported in: • MTAR • SER	Individual collection, biological	→ Annual, during hunting season (**BFDNEAR** sample split with NYSDOH) During year as available (**BFDCTRL** sample split with NYSDOH)	→ 3 → 3	Gamma isotopic and Sr-90 analysis of meat, H-3 in free moisture; % moisture

Sampling Rationale

BFVNEAR DOE/EH-0173T, 5.8.2.2

Fruits and vegetables (corn, apples, and beans or leafy vegetables, if available) collected from areas near the site. These samples are collected, if possible, from areas near the site predicted to have worst-case downwind concentrations of radionuclides in air and soil. Sample analysis reflects steady state/chronic uptake or contamination of foodstuffs as a result of site activities. Possible pathway directly to humans or indirectly through animals.

BFVCTRL DOE/EH-0173T, 5.8.2.2

Fruits and vegetables collected from an area remote from the site. Background fruits and vegetables collected for comparison with near-site samples. Collected in area(s) of no possible site effects.

BFHNEAR DOE/EH-0173T, 5.8.2.2

Hay collected from area near the site. Same as for near-site fruits and vegetables (**BFVNEAR**). Indirect pathway to humans through animals. Collected from same location as beef or milk sample.

BFHCTLS
BFHCTLN DOE/EH-0173T, 5.8.2.2

Hay collected from areas remote from the site. Background hay collected for comparison with near-site samples. Collected in area(s) of no possible effects from the site.

BFBNEAR DOE/EH-0173T, 5.8.2.3

Beef collected from animals raised near the site and foraging downwind of the site in areas of maximum probable effects. Following the rationale for vegetable matter collected near the site (**BFVNEAR** and **BFHNEAR**), edible flesh portion of beef animals is analyzed to determine possible radionuclide content passable directly to humans.

BFBCTRL DOE/EH-0173T, 5.8.2.3

Beef collected from animals raised far from the site. Background beef collected for comparison with near-site samples. Collected in area(s) of no possible site effects.

BFDNEAR DOE/EH-0173T, 5.8.3

Venison from deer herd found living near the site. Same as for beef (**BFBNEAR**).

BFDCTRL DOE/EH-0173T, 5.8.3

Venison from deer herd found living far from the site. Background deer meat collected for comparison with near-site samples. Collected in area(s) of no possible site effects.

■ Sampling locations are shown on Figures A-9 and A-12 (pp. A-11 and A-14).

1999 Monitoring Program
Environmental Surveillance

Off-site Direct Radiation

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
DFTLD Series *Thermoluminescent Dosimetry (TLD) Off-site:* **#1-#16** *Each of 16 Compass Sectors at Nearest Accessible Perimeter Point* **#17** *"5 points" Landfill 19.6 km Southwest (background)* **#20** *1,500 m Northwest (downwind receptor)* **#21** *Springville 9.4 km North* **#22** *West Valley 6.2 km South-Southeast* **#23** *Great Valley 30.9 km South (background)* **#37** *Nashville 39.8 km Northwest (background)* **#41** *Sardinia-Savage Road 15.5 km Northeast (background)*	Direct radiation around facility Reported in: • MTAR • SER	Integrating LiF TLD	→ Quarterly	→ TLD cards at each of 23 locations collected 4 times per year	→ Quarterly gamma radiation exposure

Sampling Rationale

Dosimetry Off-site

DOE/EH-0173T, 5.5; DOE/EP-0023, 4.6.3

TLDs offer continuous integrated environmental gamma-ray monitoring and have been deployed systematically about the site. Off-site TLDs are used to verify that site activities have not adversely affected the surrounding environs.

A biennial HPIC gamma radiation measurement is completed at all locations in order to confirm TLD measurements.

■ Sampling locations are shown on Figures A-11 and A-12 (pp. A-13 and A-14).

1999 Monitoring Program
Environmental Surveillance

On-site Direct Radiation

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
DNTLD Series *Thermoluminescent Dosimetry (TLD) On-site:* **#18, #19, #33** *At three corners of the SDA* **#24, #26-#32, #34** *9 TLDS at the security fence around the site* **#35, #36, #38-#40** *5 TLDs on-site near operational areas* **#25** *Rock Springs Road 500 m North-Northwest of the plant* **#42** *SDA T-1 building* **#43** *SDA west perimeter fence*	Direct radiation around facility Reported in: • MTAR • SER	Integrating LiF TLD	→ Quarterly	→ TLD cards at each of 20 locations collected 4 times per year	→ Quarterly gamma radiation exposure

Sampling Rationale

Dosimetry
On-site

DOE/EH-0173T, 5.4 and 5.5

On-site TLDs monitor waste management units and verify that the potential dose rate to the general public (i.e., at Rock Springs Road) is below 100 mrem/year (1 mSv/year) from site activities.

A biennial HPIC gamma radiation measurement is completed at all locations in order to confirm TLD measurements.

Potential TLD sampling locations are continually evaluated with respect to site activities.

■ Sampling locations are shown on Figure A-10 (p. A-12).